UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

Wilus Institute of Standards and Technology Inc.,	CASE NO.
Plaintiff,	
vs.	**Complaint for Patent Infringement**
Askey Computer Corp., Askey International Corp.,	**JURY DEMANDED**
Defendants.	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Wilus Institute of Standards and Technology Inc. ("Wilus") files this complaint against Defendants Askey Computer Corp. ("ACC") and Askey International Corp. ("AIC") (collectively, "Askey"), alleging infringement of U.S. Patent Nos. 10,313,077, 10,651,992, and 11,128,421. The Accused Products are Wi-Fi 6 (802.11ax) enabled devices used, offered for sale, sold, and/or imported by Defendants in the United States and supplied by Defendants to customers in the United States.

BACKGROUND

1.   This complaint arises from Defendants' infringement of the following United States patents owned by Wilus, each of which relates to the "PHY" or "physical layer" of wireless communications technology: United States Patent Nos. 10,313,077 ("'077 patent"), 10,651,992 ("'992 patent"), and 11,128,421 ("'421 patent") (collectively, "Asserted Patents").

NOTICE OF THE ASSSERTED PATENTS

2.   The patented technologies which are the subject of this lawsuit are well known to Defendants.

3.   For example, on April 8, 2022, ACC was sent a letter by Sisvel International S.A. ("Sisvel"), acting in its role as a licensing manager of certain patents related to the IEEE Wi-Fi 6 (802.11ax) standard. This letter conveyed Wilus's and Sisvel's belief that Askey products practiced Wilus patents and required a license to these Wilus patents. The letter contained a list of "patents essential to the 802.11ax standard," which included the '077, '992, and '421 patents. The letter identified specific Askey products as examples of products that implement essential features of the Wi-Fi 6 standard. It also contained a link to a brochure that included a table identifying specific sections and figures of the Wi-Fi 6 standard as illustrations of what the essential patents covered in the standard. The letter included an offer to grant a patent license for Wilus patents including the '077, '992, and '421 patents to ACC in exchange for royalty payments.

4.   As other examples, on August 24, 2022, January 18, 2023, September 19, 2023, and October 25, 2023, ACC was sent follow-up letters by Sisvel that contained the same information as the April 8, 2022 letter, including Wilus's and Sisvel's belief that Askey products practiced Wilus patents essential to the 802.11ax standard (including the '077, '992, and '421 patents) and required a license to these Wilus patents. The January 18, 2023, September 19, 2023, and October 25, 2023 letters also included a "list of Pool Wi-Fi 6 SEPs evaluated by independent third-party patent evaluators as being essential to the Wi-Fi 6 Standard." This list included the '077, '992, and '421 patents.

PLAINTIFF WILUS AND THE ASSERTED PATENTS

5.   Plaintiff Wilus is a research and development company specializing in the development of new technologies related to wireless communications and multimedia, including Wi-Fi and other wireless protocols. Founded in 2012, Wilus has been at the forefront of research and development in wireless communications for more than a decade. The company is employee-owned, and its team currently consists of 20 engineers and inventors.

6.   Since its formation Wilus has made over 700 technical contributions to leading standards bodies that define international standards for technologies including cellular wireless, wireless LAN, and multimedia compression. In particular, Wilus has played a crucial role in the development and standardization of Wi-Fi 6 technologies, contributing significantly to the enhanced speed, efficiency, capabilities, and performance of Wi-Fi 6 networks. Its work is significant in the context of the standards pertaining to Wi-Fi 6, both in terms of the number of technical contributions and in terms of the importance of those technical contributions to the standards.

7.   Wilus is a corporation organized under the laws of South Korea, with its principal place of business at 5F 216 Hwangsaeul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13595 Republic of Korea.

8.   Wilus is the owner of all right, title, and interest in U.S. Patent No. 10,313,077, titled "Wireless communication method and wireless communication terminal for coexistence with legacy wireless communication terminal," and issued June 4, 2019. A copy of the '077 patent is attached as Exhibit 1.

9.   Wilus is the owner of all right, title, and interest in U.S. Patent No. 10,651,992, titled "Wireless communication method and wireless communication terminal for coexistence with

legacy wireless communication terminal," and issued May 12, 2020. A copy of the '992 patent is attached as Exhibit 2.

10.   Wilus is the owner of all right, title, and interest in U.S. Patent No. 11,128,421, titled "Wireless communication method and wireless communication terminal for coexistence with legacy wireless communication terminal," and issued September 21, 2021. A copy of the '421 patent is attached as Exhibit 3.

DEFENDANTS AND THE ACCUSED PRODUCTS

11.   On information and belief, Defendant Askey Computer Corp. is a corporation organized under the laws of Taiwan, with its principal place of business located at 10F, No. 119, Jiankang Rd., Zhonghe Dist., New Taipei City 23585, Taiwan, R.O.C.

12.   On information and belief, Defendant Askey International Corp. is a United States corporation organized under the laws of California, with a place of business at 4017 Clipper Court, Fremont California 94538.

13.   On information and belief, AIC is a wholly owned subsidiary of ACC.

14.   On information and belief, AIC distributes certain Askey electronics products, including the Accused Products, in the United States.

15.   The Accused Products are all of Askey's Wi-Fi 6 (802.11ax) enabled devices, including routers and other access point devices, used, offered for sale, sold, and/or imported by Defendants in the United States.

JURISDICTION AND VENUE

16.   This action arises under the patent laws of the United States, Title 35 of the United States Code.

17.   This Court has original subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331

and 1338(a).

18.   This Court has personal jurisdiction over Askey in this action because Askey has committed acts of infringement within this District giving rise to this action, has a regular and established place of business in this District, and has established minimum contacts with this forum such that the exercise of jurisdiction over Askey would not offend traditional notions of fair play and substantial justice. Askey, directly and/or through subsidiaries or intermediaries, conducts its business extensively throughout Texas, by shipping, distributing, offering for sale, selling, and advertising its products and/or services in Texas and the Eastern District of Texas, regularly does business or solicit business, engage in other persistent courses of conduct, and/or derives substantial revenue from products and/or services provided to entities in Texas, and commits acts of infringement of Wilus's patents in this District by, among other things, making, using, importing, offering to sell, and selling products that infringe the asserted patents, including without limitation the Askey Wi-Fi 6 enabled devices accused of infringement in this case.

19.   Askey, directly and/or through subsidiaries or intermediaries, has purposefully and voluntarily placed one or more products and/or services in the stream of commerce that practice the Asserted Patents with the intention and expectation that they will be purchased and used by consumers in the Eastern District of Texas. These products and/or services have been and continue to be purchased and used in the Eastern District of Texas.

20.   Venue as to Askey is proper in this District under 28 U.S.C. §§ 1391 and 1400(b). Askey has transacted business in this District and has committed acts of direct and indirect infringement in this District by, among other things, making, using, importing, offering to sell, and selling products that infringe the Asserted Patents.

21.   Defendant ACC is a foreign corporation. Venue is proper as to a foreign defendants

in any district. 28 U.S.C. §§ 1391(c)(3).

COUNT 1 – CLAIM FOR INFRINGEMENT OF THE '077 PATENT

22.   Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

23.   On June 4, 2019, the United States Patent and Trademark Office issued U.S. Patent No. 10,313,077, titled "Wireless communication method and wireless communication terminal for coexistence with legacy wireless communication terminal." Exhibit 1.

24.   The '077 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

25.   Wilus is the owner of the '077 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

26.   The claims of the '077 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the '077 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

27.   Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the '077 patent, and Wilus is entitled to damages for Defendants' past infringement. For example, Sisvel's letters conveying Wilus's and Sisvel's belief that Askey

products practiced Wilus's '077 patent and offering to license Wilus's patents to Askey provided Askey with actual notice of infringement.

28.   Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the '077 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of the '077 patent; and inducing and contributing to infringement by others of the claims of the '077 patent.

29.   The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including routers and other access point devices. On information and belief, Defendants use, import, offer for sale, and sell Accused Products in the United States, or sell Accused Products to original equipment manufacturers ("OEMs") or resellers such as Spectrum, Verizon, and Dynalink (who may rebrand Accused Products under their own names), with knowledge, expectation, specific intent, and foresight that such OEMs, resellers, and related parties, including customers, distributors, counterparties and intermediaries, will infringe the '077 Patent by importing, selling, offering to sell, using, and/or making Accused Products in the United States.

30.   The Accused Products satisfy all claim limitations of one or more claims of the '077 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include "A wireless communication terminal that communicates wirelessly, the terminal":

Askey RT5010W

Featuring a Qualcomm IPQ8074

As the perfect WiFi solution for multi-device households and high-density WiFi environments, the Askey Wi-Fi 6 RT5010W Router is a high-performance device that will delight the most demanding customers. Specifications, Wi-Fi 6 Dual-Band 4+4 (2.4GHz, 5GHz), Qualcomm Hawkeye IPQ8072A, Qualcomm QCA8081 - 2.5GE WAN x 1 ,Qualcomm QCA8075 - 1GE LAN x 4, Qualcomm QCN5024 for 2.4 GHz 4x4 MIMO, Qualcomm QCN5054 for 5 GHz 4x4 MIMO, 4-internal Antenna for 2.4 GHz, 4-internal Antenna for 5 GHz, Dimensions - W 100 x H 230 x D 150 mm, Push Button - Power, Reset to default, WPS, Adaptor - 12V/2.5A.

(https://www.qualcomm.com/products/internet-of-things/networking/wi-fi-networks/networking-device-finder/askey-rt5010w)

31.   The Accused Products include "a transceiver" and "a processor":

(*Id.*)

32.   In the Accused Products, the processor is configured to "receive a non-legacy physical layer frame by using the transceiver":
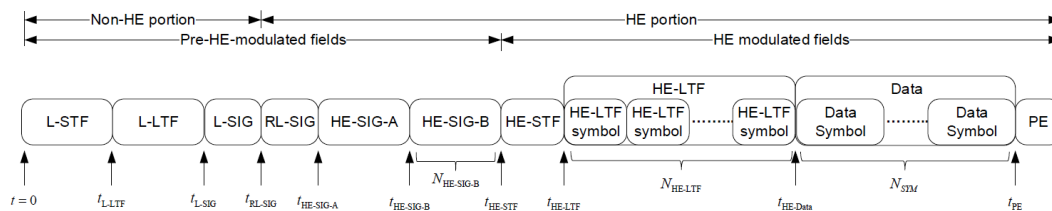

Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

(IEEE 802.11ax-2021, § 27.3.10)

33.   In the Accused Products, the processor is configured to "obtain a legacy signaling field including information decodable by a legacy wireless communication terminal from the non-legacy physical layer frame":

27.3.11.5 L-SIG field

The L-SIG field is used to communicate rate and length information. The structure of the L-SIG field is defined in Figure 17-5.

…

The L-SIG field shall be encoded, interleaved, and mapped following the steps described in 17.3.5.6, 17.3.5.7, and 17.3.5.8. The stream of 48 complex numbers generated by these steps is denoted by

d_k, $k = 0, …, 47$ and is mapped to subcarriers [−26, 26]. In addition, values [−1, −1, −1, 1] are mapped to the extra subcarriers [−28, −27, 27, 28] of the L-SIG field of a 20 MHz HE PPDU. Subcarriers [−28, −27, 27, 28] are also BPSK modulated. Pilots shall be inserted as described in 17.3.5.9.

(IEEE 802.11ax-2021)

34.   In the Accused Products, the processor is configured to "obtain length information indicating information on a duration of the non-legacy physical layer frame, from the legacy signaling field":

For an HE TB PPDU, the LENGTH field is set to the TXVECTOR parameter L_LENGTH. For an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU, the LENGTH field is set to the value given by the Equation (27-11).

$$\text{Length} = \left\lceil \frac{TXTIME - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \qquad (27\text{-}11)$$

where
    TXTIME   is defined in 27.4.3 (in μs)

(IEEE 802.11ax-2021, § 27.3.11.5)

35.   In the Accused Products, the processor is configured to "obtain information other than information on the duration of the non-legacy physical layer frame through a remaining value obtained by dividing the length information by a data size transmittable by a symbol of a legacy

physical layer frame, wherein the data size transmittable by a symbol of the legacy physical layer

frame is 3 octets when a data rate of the legacy physical layer frame is 6 Mbps":

$$\text{Length} = \left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \quad (27\text{-}11)$$

where

TXTIME   is defined in 27.4.3 (in μs)

m is 1 for an HE MU PPDU and HE ER SU PPDU and 2 otherwise

(IEEE 802.11ax-2021, § 27.3.11.5)

The L_DATARATE parameter of the TXVECTOR shall be set to the value 6 Mb/s.

A STA that is transmitting a PPDU with the FORMAT parameter of the TXVECTOR equal to HT_MF shall set the value of the L_LENGTH parameter to the value (in octets) given by Equation (10-16):

$$\text{L\_LENGTH} = \left\lceil \frac{((\text{TXTIME} - \text{Signal Extension}) - \text{NonHTLength})}{\text{aSymbolLength}} \right\rceil \times N_{OPS} \\ - \left\lceil \frac{\text{PHYServiceLength} + \text{PHYConvolutionalTailLength}}{8} \right\rceil \quad (10\text{-}16)$$

where

TXTIME   is the duration (in microseconds) of the HT PPDU defined in 6.5.5

Signal Extension   is 0 μs when TXVECTOR parameter NO_SIG_EXTN is true and is aSignalExtension as defined in Table 19-25 of 19.4.4 when TXVECTOR parameter NO_SIG_EXTN is false

aSymbolLength   is the duration of a symbol (in microseconds), defined in 6.5.4

NonHTLength   is 20 μs, the duration of the non-HT PHY preamble and L-SIG

N_{OPS} is the number of octets transmitted during a period of aSymbolLength at the rate specified by L_DATARATE

PHYServiceLength   is 16 bits, the number of bits in the PHY SERVICE field

PHYConvolutionalTailLength

     is 6 bits, the number of bits in the convolutional code tail bit sequence

NOTE 1—The last term of the L_LENGTH definition corrects for the fact that non-HT STAs add the length of the SERVICE field and tail bits (assuming a single convolutional encoder) to the value communicated by the L_LENGTH field.

Equation (10-16) can be simplified to Equation (10-17)

$$\text{L\_LENGTH} = \left\lceil \frac{((\text{TXTIME} - \text{Signal Extension}) - 20)}{4} \right\rceil \times 3 - 3 \quad (10\text{-}17)$$

(IEEE 802.11-2020, § 10.27.4)

     36.   In the Accused Products, the processor is configured to "determine the number of

symbols of data of the non-legacy physical layer frame according to a following equation,

$$N_{SYM} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{HE\_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE\_Disambiguity}$$ where $\lfloor x \rfloor$ denotes a

largest integer less than or equal to x, L_LENGTH denotes the length information, m denotes a

value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame, $b_{PE\_Disambiguity}$ denotes a value of PE Disambiguity field, $T_{HE\_PREAMBLE}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame, T_{SYM} denotes a duration of a symbol of the data of the non-legacy physical layer frame":

27.3.13 Packet extension

. . .

The receiver computes N_{SYM}, T_{PE}, and N_{MA} using Equation (27-119), Equation (27-120), and Equation (27-122), respectively.

$$(27\text{-}119)$$

$$N_{SYM} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}} \right) / T_{SYM} \right\rfloor - b_{\text{PE-Disambiguity}}$$

$$(27\text{-}120)$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} \right) - N_{SYM}T_{SYM} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}}{4} \right\rfloor \times 4$$

where

L_LENGTH   is the value indicated by the LENGTH field of the L-SIG field

$$T_{\text{HE-PREAMBLE}} = \qquad\qquad\qquad\qquad (27\text{-}121)$$

$$\begin{cases} T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-T}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE TB PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE SU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + N_{\text{HE-SIG-B}}T_{\text{HE-SIG-B}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE MU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A-R}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE ER SU PPDU} \end{cases}$$

where

$T_{\text{RL-SIG}}$, $T_{\text{HE-STF-T}}$, $T_{\text{HE-STF-NT}}$, $T_{\text{HE-LTF-SYM}}$, $T_{\text{HE-SIG-A}}$, $T_{\text{HE-SIG-A-R}}$, and $T_{\text{HE-SIG-B}}$ are defined in Table 27-12

$N_{\text{HE-SIG-B}}$ and $N_{\text{HE-LTF}}$ are defined in Table 27-15

$b_{\text{PE-Disambiguity}}$ is the value indicated by the PE Disambiguity subfield of the HE-SIG-A field for an HE SU, HE ER SU, or HE MU PPDU or the value indicated by the PE Disambiguity subfield in the Common Info field in the Trigger frame (see Table 9-29g) for an HE TB PPDU

. . .

$$(27\text{-}122)$$

$$N_{MA} = \begin{cases} 0, \text{ if Doppler} = 0 \\ max\left(0, \left\lfloor \frac{\text{L\_LENGTH} + 3 + m}{3} \times 4 - T_{\text{HE-PREAMBLE}} - (b_{\text{PE-Diambiguity}} + 2) \cdot T_{SYM} \right) / T_{MA} \right\rfloor \right), \text{ if Doppler} = 1 \end{cases}$$

(IEEE 802.11ax-2021)

37. In the Accused Products, "the PE Disambiguity field is set based on the duration of a symbol of the data of the non-legacy physical layer frame and an increment of duration to set a value of the length information based on a duration of a symbol of the legacy physical layer frame."

> The PE Disambiguity field of the HE-SIG-A field for an HE SU, HE ER SU (see Table 27-18), or HE MU PPDU (see Table 27-20) shall be set to 1 if the condition in Equation (27-118) is met; otherwise, it shall be set to 0.
>
> The PE Disambiguity subfield in the Common Info field of the Trigger frame (see Table 9-29g) shall be set to 1 if the condition in Equation (27-118) is met for the HE TB PPDU solicited by the Trigger frame. Otherwise, it shall be set to 0.

$$(27\text{-}118)$$

$$T_{PE} + 4 \times \left(\left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil - \left(\frac{\text{TXTIME} - SignalExtension - 20}{4} \right) \right) \geq T_{SYM}$$

> where
> T_{PE} is the PE field duration
> T_{SYM} is the symbol duration of the Data field as defined in 27.3.9

(IEEE 802.11ax-2021, § 27.3.13)

38. Defendants have also knowingly and intentionally induced and contributed to infringement of the '077 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the '077 patent and the infringing nature of the Accused Products at least because ACC had received the April 8, 2022 letter from Sisvel identifying the '077 patent as "essential to the 802.11ax standard" and identifying examples of Askey products that implement essential features of the standard.

39. Despite this knowledge of the '077 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the '077 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the '077 patent, thereby

specifically intending for and inducing their customers to infringe the '077 patent through the customers' normal and customary use of the Accused Products.

40.   On information and belief, the Accused Products contain components that constitute a material part of the '077 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the '077 patent.

41.   On information and belief, Defendants' infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the '077 patent.

42.   Defendants have induced, and continue to induce, infringement of the '077 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

43.   Askey and its customers benefit from the use of the inventions claimed in the '077 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

44.   Wilus has been damaged by Defendants' willful infringement of the '077 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

COUNT 2 – CLAIM FOR INFRINGEMENT OF THE '992 PATENT

45.   Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

46.   On May 12, 2020, the United States Patent and Trademark Office issued U.S. Patent No. 10,651,992, titled "Wireless communication method and wireless communication terminal for coexistence with legacy wireless communication terminal." Exhibit 2.

47.   The '992 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

48.   Wilus is the owner of the '992 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

49.   The claims of the '992 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the '992 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

50.   Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the '992 patent, and Wilus is entitled to damages for Defendants' past infringement. For example, Sisvel's letters conveying Wilus's and Sisvel's belief that Askey

products practiced Wilus's '992 patent and offering to license Wilus's patents to Askey provided

Askey with actual notice of infringement.

51.   Defendants have directly infringed (literally and equivalently) and induced and

contributed to infringement by others of the '992 patent by, without a license or permission from

Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of

the '992 patent; and inducing and contributing to infringement by others of the claims of the '

992 patent.

52.   The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices,

including routers and other access point devices. On information and belief, Defendants use,

import, offer for sale, and sell Accused Products in the United States, or sell Accused Products to

original equipment manufacturers ("OEMs") or resellers such as Spectrum, Verizon, and Dynalink

(who may rebrand Accused Products under their own names), with knowledge, expectation,

specific intent, and foresight that such OEMs, resellers, and related parties, including customers,

distributors, counterparties and intermediaries, will infringe the '992 Patent by importing, selling,

offering to sell, using, and/or making Accused Products in the United States.

53.   The Accused Products satisfy all claim limitations of one or more claims of the '

992 Patent. On information and belief, the Accused Products employ, implement, or utilize

materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused

Product will be material to all Accused Products. For example, the Accused Products include A

wireless communication terminal that communicates wirelessly":

Askey RT5010W

Featuring a Qualcomm IPQ8074

As the perfect WiFi solution for multi-device households and high-density WiFi environments, the Askey Wi-Fi 6 RT5010W Router is a high-performance device that will delight the most demanding customers. Specifications, Wi-Fi 6 Dual-Band 4+4 (2.4GHz, 5GHz), Qualcomm Hawkeye IPQ8072A, Qualcomm QCA8081 - 2.5GE WAN x 1 ,Qualcomm QCA8075 - 1GE LAN x 4, Qualcomm QCN5024 for 2.4 GHz 4x4 MIMO, Qualcomm QCN5054 for 5 GHz 4x4 MIMO, 4-internal Antenna for 2.4 GHz, 4-internal Antenna for 5 GHz, Dimensions - W 100 x H 230 x D 150 mm, Push Button - Power, Reset to default, WPS, Adaptor - 12V/2.5A.

(https://www.qualcomm.com/products/internet-of-things/networking/wi-fi-networks/networking-device-finder/askey-rt5010w)

54.   The Accused Products include "a transceiver" and "a processor":

Featuring a Qualcomm IPQ8074

As the perfect WiFi solution for multi-device households and high-density WiFi environments, the Askey Wi-Fi 6 RT5010W Router is a high-performance device that will delight the most demanding customers. Specifications, Wi-Fi 6 Dual-Band 4+4 (2.4GHz, 5GHz), Qualcomm Hawkeye IPQ8072A, Qualcomm QCA8081 - 2.5GE WAN x 1 ,Qualcomm QCA8075 - 1GE LAN x 4, Qualcomm QCN5024 for 2.4 GHz 4x4 MIMO, Qualcomm QCN5054 for 5 GHz 4x4 MIMO, 4-internal Antenna for 2.4 GHz, 4-internal Antenna for 5 GHz, Dimensions - W 100 x H 230 x D 150 mm, Push Button - Power, Reset to default, WPS, Adaptor - 12V/2.5A.

(*Id.*)

55.   In the Accused Products, the processor is configured to "receive a non-legacy physical layer frame by using the transceiver":
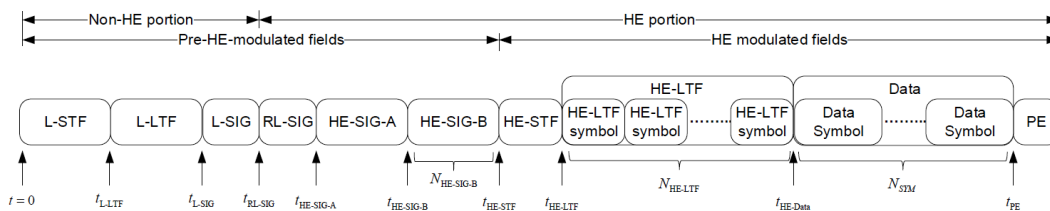
Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

(IEEE 802.11ax-2021, § 27.3.10)

56.   In the Accused Products, the processor is configured to "obtain a legacy signaling field including information decodable by a legacy wireless communication terminal from the non-legacy physical layer frame":

27.3.11.5 L-SIG field

The L-SIG field is used to communicate rate and length information. The structure of the L-SIG field is defined in Figure 17-5.

…

The L-SIG field shall be encoded, interleaved, and mapped following the steps described in 17.3.5.6, 17.3.5.7, and 17.3.5.8. The stream of 48 complex numbers generated by these steps is denoted by

d_k, $k = 0, \ldots, 47$ and is mapped to subcarriers [–26, 26]. In addition, values [–1, –1, –1, 1] are mapped to the extra subcarriers [–28, –27, 27, 28] of the L-SIG field of a 20 MHz HE PPDU. Subcarriers [–28, –27, 27, 28] are also BPSK modulated. Pilots shall be inserted as described in 17.3.5.9.

(IEEE 802.11ax-2021)

57.   In the Accused Products, the processor is configured to "obtain length information indicating information on a duration of the non-legacy physical layer frame, from the legacy signaling field":

For an HE TB PPDU, the LENGTH field is set to the TXVECTOR parameter L_LENGTH. For an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU, the LENGTH field is set to the value given by the Equation (27-11).

$$\text{Length} = \left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \qquad (27\text{-}11)$$
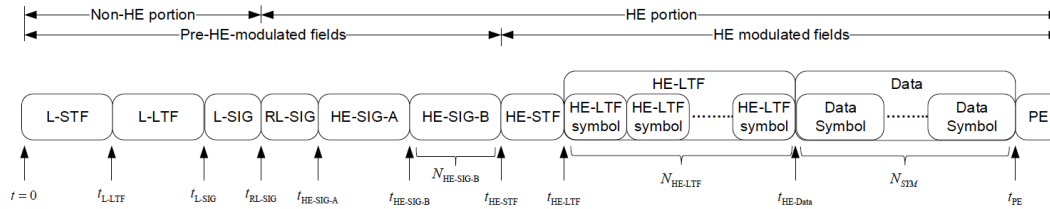
where
    TXTIME   is defined in 27.4.3 (in μs)

(IEEE 802.11ax-2021, § 27.3.11.5)

58.   In the Accused Products, the processor is configured to "obtain information other than information on the duration of the non-legacy physical layer frame based on a modulation method of a third symbol after the legacy signaling field and a remaining value obtained by

dividing the length information by a data size transmittable by a symbol of a legacy physical layer frame, wherein the information other than information on the duration of the non-legacy physical layer frame indicates a format of a non-legacy signaling field included in the non-legacy physical layer frame":
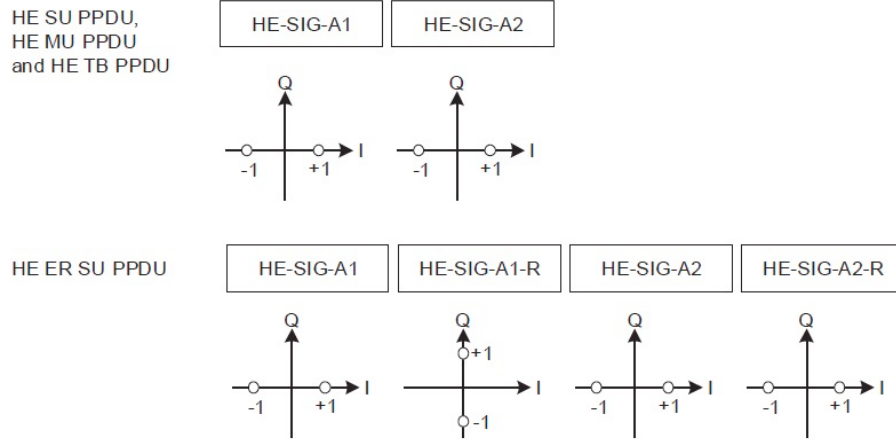

Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

(IEEE 802.11ax-2021, § 27.3.10)

For an HE SU PPDU, HE MU PPDU, and HE TB PPDU, the HE-SIG-A field is composed of two subfields, HE-SIG-A1 and HE-SIG-A2, each containing 26 data bits. The HE-SIG-A1 subfield is transmitted before the HE-SIG-A2 subfield. The data bits of the HE-SIG-A OFDM symbols shall be BCC encoded at rate $R = 1/2$, be interleaved, be mapped to a BPSK constellation, and have pilots inserted following the steps described in 17.3.5.6, 27.3.12.8, 17.3.5.8, and 17.3.5.9, respectively. The constellation mappings of the HE-SIG-A field in an HE SU PPDU, HE MU PPDU, and HE TB PPDU are shown in Figure 27-25. The first half and second half of the stream of 104 complex numbers generated by these steps (before pilot insertion) are divided into two groups of 52 complex numbers, where the first 52 complex numbers form the first OFDM symbol of the HE-SIG-A field and the second 52 complex numbers form the second OFDM symbol of the HE-SIG-A field, respectively.

For an HE ER SU PPDU, the HE-SIG-A field is composed of four subfields: HE-SIG-A1, HE-SIG-A1-R, HE-SIG-A2, and HE-SIG-A2-R. Each subfield contains 26 data bits. These four subfields are transmitted sequentially from HE-SIG-A1 to HE-SIG-A2-R. The data bits of the HE-SIG-A1 and HE-SIG-A2 subfields shall be BCC encoded at rate $R = 1/2$, be interleaved, be mapped to a BPSK constellation, and have pilots inserted. The HE-SIG-A1-R subfield has the same encoded bits as the HE-SIG-A1 subfield, and the encoded bits shall be mapped to a QBPSK constellation without interleaving and have pilots inserted. The constellation mappings of the HE-SIG-A field in an HE ER SU PPDU are shown in Figure 27-25. The QBPSK constellation on the HE-SIG-A1-R subfield is used to differentiate between an HE ER SU PPDU and an HE MU PPDU when $m = 1$ in Equation (27-11). The HE-SIG-A2-R subfield has the same encoded bits as the HE-SIG-A2 subfield, and the encoded bits shall be mapped to a BPSK constellation without interleaving and have pilots inserted. BCC encoding, data interleaving, constellation mapping, and pilot insertion follow the steps described in 17.3.5.6, 27.3.12.8, 17.3.5.8, and 17.3.5.9, respectively.

Figure 27-25—Data subcarrier constellation of HE-SIG-A symbols

(IEEE 802.11ax-2021, § 27.3.11.7.4)

$$\text{Length} = \left\lceil \frac{TXTIME - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \qquad (27\text{-}11)$$

where
TXTIME   is defined in 27.4.3 (in μs)
m   is 1 for an HE MU PPDU and HE ER SU PPDU and 2 otherwise

(IEEE 802.11ax-2021, § 27.3.11.5)

59.   In the Accused Products, the processor is configured to "determine the number of symbols of data of the non-legacy physical layer frame according to a following equation,

$$N_{SYM} = \left\lfloor \left(\frac{L\_LENGTH + m + 3}{3} \times 4 - T_{HE\_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE\_Disambiguity}$$ where $\lfloor x \rfloor$ denotes a

largest integer less than or equal to x, L_LENGTH denotes the length information, m denotes a

value obtained by subtracting the remaining value from the data size transmittable by a symbol of

the legacy physical layer frame, $b_{PE\_Disambiguity}$ denotes a value of PE Disambiguity field,

$T_{HE\_PREAMBLE}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame,

T_{SYM} denotes a duration of a symbol of the data of the non-legacy physical layer frame":

27.3.13 Packet extension

. . .

19

The receiver computes N_{SYM}, T_{PE}, and N_{MA} using Equation (27-119), Equation (27-120), and Equation (27-122), respectively.

$$N_{SYM} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} - N_{MA} N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}} \right) / T_{SYM} \right\rfloor - b_{\text{PE-Disambiguity}} \tag{27-119}$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} \right) - N_{SYM} T_{SYM} - N_{MA} N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}}{4} \right\rfloor \times 4 \tag{27-120}$$

where

L_LENGTH is the value indicated by the LENGTH field of the L-SIG field

$$T_{\text{HE-PREAMBLE}} = \tag{27-121}$$

$$\begin{cases} T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-T}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE TB PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE SU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + N_{\text{HE-SIG-B}} T_{\text{HE-SIG-B}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE MU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A-R}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}} T_{\text{HE-LTF-SYM}}, \text{ for an HE ER SU PPDU} \end{cases}$$

where

$T_{\text{RL-SIG}}$, $T_{\text{HE-STF-T}}$, $T_{\text{HE-STF-NT}}$, $T_{\text{HE-LTF-SYM}}$, $T_{\text{HE-SIG-A}}$, $T_{\text{HE-SIG-A-R}}$, and $T_{\text{HE-SIG-B}}$ are defined in Table 27-12

$N_{\text{HE-SIG-B}}$ and $N_{\text{HE-LTF}}$ are defined in Table 27-15

$b_{\text{PE-Disambiguity}}$ is the value indicated by the PE Disambiguity subfield of the HE-SIG-A field for an HE SU, HE ER SU, or HE MU PPDU or the value indicated by the PE Disambiguity subfield in the Common Info field in the Trigger frame (see Table 9-29g) for an HE TB PPDU

. . .

$$N_{MA} = \begin{cases} 0, \text{ if Doppler} = 0 \\ max\left(0, \left\lfloor \left(\frac{\text{L\_LENGTH} + 3 + m}{3} \times 4 - T_{\text{HE-PREAMBLE}} - (b_{\text{PE-Diambiguity}} + 2) \cdot T_{SYM} \right) / T_{MA} \right\rfloor \right), \text{ if Doppler} = 1 \end{cases} \tag{27-122}$$

(IEEE 802.11ax-2021)

60.   In the Accused Products, "the PE Disambiguity field is set based on the duration of a symbol of the data of the non-legacy physical layer frame and an increment of duration to set a value of the length information based on a duration of a symbol of the legacy physical layer frame."

The PE Disambiguity field of the HE-SIG-A field for an HE SU, HE ER SU (see Table 27-18), or HE MU PPDU (see Table 27-20) shall be set to 1 if the condition in Equation (27-118) is met; otherwise, it shall be set to 0.

The PE Disambiguity subfield in the Common Info field of the Trigger frame (see Table 9-29g) shall be set to 1 if the condition in Equation (27-118) is met for the HE TB PPDU solicited by the Trigger frame. Otherwise, it shall be set to 0.

(27-118)

$$T_{PE} + 4 \times \left(\left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil - \left(\frac{\text{TXTIME} - SignalExtension - 20}{4} \right) \right) \geq T_{SYM}$$

where

T_{PE} is the PE field duration

T_{SYM} is the symbol duration of the Data field as defined in 27.3.9

(IEEE 802.11ax-2021, § 27.3.13)

61.   Defendants have also knowingly and intentionally induced and contributed to infringement of the ′992 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the ′992 patent and the infringing nature of the Accused Products at least because ACC had received the April 8, 2022, letter from Sisvel identifying the ′992 patent as "essential to the 802.11ax standard" and identifying examples of Askey products that implement essential features of the standard.

62.   Despite this knowledge of the ′992 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the ′992 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the ′992 patent, thereby specifically intending for and inducing their customers to infringe the ′992 patent through the customers' normal and customary use of the Accused Products.

63. On information and belief, the Accused Products contain components that constitute a material part of the ′992 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the ′992 patent.

64. On information and belief, Defendants' infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the ′992 patent.

65. Defendants have induced, and continue to induce, infringement of the ′992 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

66. Askey and its customers benefit from the use of the inventions claimed in the ′992 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

67.   Wilus has been damaged by Defendants' willful infringement of the '992 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

COUNT 3 – CLAIM FOR INFRINGEMENT OF THE '421 PATENT

68.   Wilus incorporates by reference each of the allegations in the foregoing paragraphs as if fully set forth herein and further alleges as follows:

69.   On September 21, 2021, the United States Patent and Trademark Office issued U.S. Patent No. 11,128,421, titled "Wireless communication method and wireless communication terminal for coexistence with legacy wireless communication terminal." Exhibit 3.

70.   The '421 patent claims devices and methods used to implement the PHY layer of Wi-Fi 6 wireless LANs.

71.   Wilus is the owner of the '421 patent with full rights to pursue recovery of royalties for damages for infringement, including full rights to recover past and future damages.

72.   The claims of the '421 patent were issued by the United States Patent and Trademark Office and are presumed by statute to be valid. They are not directed to abstract ideas and moreover contain inventive concepts sufficient to ensure that the patent amounts to significantly more than a patent on a patent ineligible concept itself. The written description of the '421 patent describes in technical detail each limitation of the claims, allowing a skilled artisan to understand the scope of the claims and how the nonconventional and non-generic combination of claim limitations is patentably distinct from and improved upon what may have been considered conventional or generic in the art at the time of the invention.

73.   Wilus and its predecessors in interest have satisfied the requirements of 35 U.S.C. § 287(a) with respect to the '421 patent, and Wilus is entitled to damages for Defendants' past

infringement. For example, Sisvel's letters conveying Wilus's and Sisvel's belief that Askey products practiced Wilus's '421 patent and offering to license Wilus's patents to Askey provided Askey with actual notice of infringement.

74.   Defendants have directly infringed (literally and equivalently) and induced and contributed to infringement by others of the '421 patent by, without a license or permission from Wilus: making, using, selling, offering for sale, or importing products that infringe the claims of the '421 patent; and inducing and contributing to infringement by others of the claims of the '421 patent.

75.   The Accused Products are, for example, Wi-Fi 6 (802.11ax) enabled devices, including routers and other access point devices. On information and belief, Defendants use, import, offer for sale, and sell Accused Products in the United States, or sell Accused Products to original equipment manufacturers ("OEMs") or resellers such as Spectrum, Verizon, and Dynalink (who may rebrand Accused Products under their own names), with knowledge, expectation, specific intent, and foresight that such OEMs, resellers, and related parties, including customers, distributors, counterparties and intermediaries, will infringe the '421 Patent by importing, selling, offering to sell, using, and/or making Accused Products in the United States.

76.   The Accused Products satisfy all claim limitations of one or more claims of the '421 Patent. On information and belief, the Accused Products employ, implement, or utilize materially the same Wi-Fi 6 technology, such that facts material to infringement by one Accused Product will be material to all Accused Products. For example, the Accused Products include "A wireless communication terminal that communicates wirelessly":

Askey RT5010W

Featuring a Qualcomm IPQ8074

As the perfect WiFi solution for multi-device households and high-density WiFi environments, the Askey Wi-Fi 6 RT5010W Router is a high-performance device that will delight the most demanding customers. Specifications, Wi-Fi 6 Dual-Band 4+4 (2.4GHz, 5GHz), Qualcomm Hawkeye IPQ8072A, Qualcomm QCA8081 - 2.5GE WAN x 1 ,Qualcomm QCA8075 - 1GE LAN x 4, Qualcomm QCN5024 for 2.4 GHz 4x4 MIMO, Qualcomm QCN5054 for 5 GHz 4x4 MIMO, 4-internal Antenna for 2.4 GHz, 4-internal Antenna for 5 GHz, Dimensions - W 100 x H 230 x D 150 mm, Push Button - Power, Reset to default, WPS, Adaptor - 12V/2.5A.

(https://www.qualcomm.com/products/internet-of-things/networking/wi-fi-networks/networking-device-finder/askey-rt5010w)

77.   The Accused Products include "a transceiver" and "a processor":

(*Id*.)

78.   In the Accused Products, the processor is configured to "receive a non-legacy physical layer frame by using the transceiver":
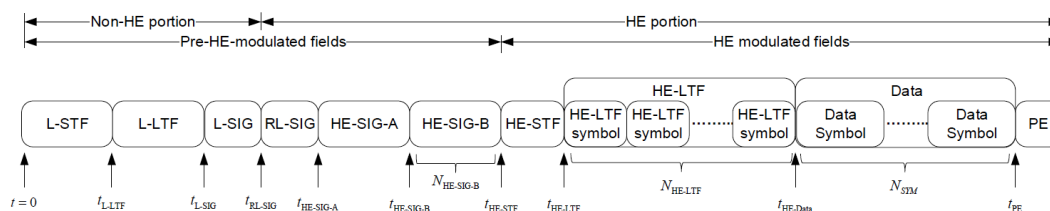

Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

25

(IEEE 802.11ax-2021, § 27.3.10)

79.   In the Accused Products, the processor is configured to "obtain a legacy signaling field including information decodable by a legacy wireless communication terminal from the non-legacy physical layer frame":

27.3.11.5 L-SIG field

The L-SIG field is used to communicate rate and length information. The structure of the L-SIG field is defined in Figure 17-5.

…

The L-SIG field shall be encoded, interleaved, and mapped following the steps described in 17.3.5.6, 17.3.5.7, and 17.3.5.8. The stream of 48 complex numbers generated by these steps is denoted by

d_k, $k = 0, …, 47$ and is mapped to subcarriers [–26, 26]. In addition, values [–1, –1, –1, 1] are mapped to the extra subcarriers [–28, –27, 27, 28] of the L-SIG field of a 20 MHz HE PPDU. Subcarriers [–28, –27, 27, 28] are also BPSK modulated. Pilots shall be inserted as described in 17.3.5.9.

(IEEE 802.11ax-2021)

80.   In the Accused Products, the processor is configured to "obtain length information indicating information on a duration of the non-legacy physical layer frame, from the legacy signaling field":

For an HE TB PPDU, the LENGTH field is set to the TXVECTOR parameter L_LENGTH. For an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU, the LENGTH field is set to the value given by the Equation (27-11).

$$\text{Length} = \left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \qquad (27\text{-}11)$$
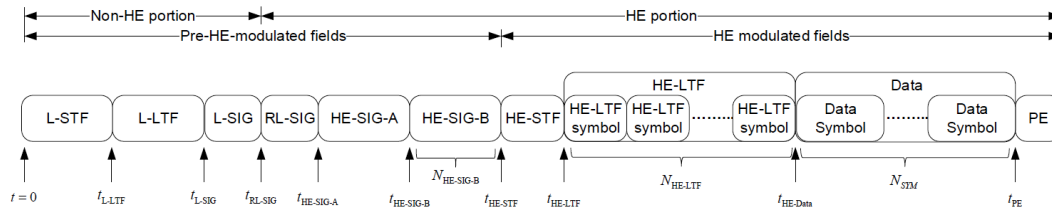
where
    TXTIME   is defined in 27.4.3 (in µs)

(IEEE 802.11ax-2021, § 27.3.11.5)

81.   In the Accused Products, the processor is configured to "obtain information other than information on the duration of the non-legacy physical layer frame based on a modulation method of a third symbol after the legacy signaling field and a remaining value obtained by

dividing the length information by a data size transmittable by a symbol of a legacy physical layer frame, wherein the modulation method is Binary Phase Shift Keying (BPSK) or Quadrature Binary Phase Shift Keying (QBPSK), wherein the information other than information on the duration of the non-legacy physical layer frame indicates a format of a non-legacy signaling field included in the non-legacy physical layer frame":
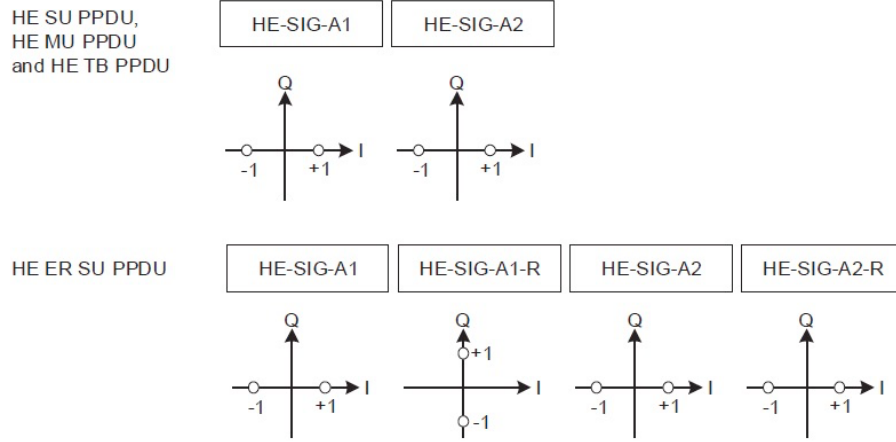

Figure 27-23—Timing boundaries for HE PPDU fields if midamble is not present

(IEEE 802.11ax-2021, § 27.3.10)

For an HE SU PPDU, HE MU PPDU, and HE TB PPDU, the HE-SIG-A field is composed of two subfields, HE-SIG-A1 and HE-SIG-A2, each containing 26 data bits. The HE-SIG-A1 subfield is transmitted before the HE-SIG-A2 subfield. The data bits of the HE-SIG-A OFDM symbols shall be BCC encoded at rate $R = 1/2$, be interleaved, be mapped to a BPSK constellation, and have pilots inserted following the steps described in 17.3.5.6, 27.3.12.8, 17.3.5.8, and 17.3.5.9, respectively. The constellation mappings of the HE-SIG-A field in an HE SU PPDU, HE MU PPDU, and HE TB PPDU are shown in Figure 27-25. The first half and second half of the stream of 104 complex numbers generated by these steps (before pilot insertion) are divided into two groups of 52 complex numbers, where the first 52 complex numbers form the first OFDM symbol of the HE-SIG-A field and the second 52 complex numbers form the second OFDM symbol of the HE-SIG-A field, respectively.

For an HE ER SU PPDU, the HE-SIG-A field is composed of four subfields: HE-SIG-A1, HE-SIG-A1-R, HE-SIG-A2, and HE-SIG-A2-R. Each subfield contains 26 data bits. These four subfields are transmitted sequentially from HE-SIG-A1 to HE-SIG-A2-R. The data bits of the HE-SIG-A1 and HE-SIG-A2 subfields shall be BCC encoded at rate $R = 1/2$, be interleaved, be mapped to a BPSK constellation, and have pilots inserted. The HE-SIG-A1-R subfield has the same encoded bits as the HE-SIG-A1 subfield, and the encoded bits shall be mapped to a QBPSK constellation without interleaving and have pilots inserted. The constellation mappings of the HE-SIG-A field in an HE ER SU PPDU are shown in Figure 27-25. The QBPSK constellation on the HE-SIG-A1-R subfield is used to differentiate between an HE ER SU PPDU and an HE MU PPDU when $m = 1$ in Equation (27-11). The HE-SIG-A2-R subfield has the same encoded bits as the HE-SIG-A2 subfield, and the encoded bits shall be mapped to a BPSK constellation without interleaving and have pilots inserted. BCC encoding, data interleaving, constellation mapping, and pilot insertion follow the steps described in 17.3.5.6, 27.3.12.8, 17.3.5.8, and 17.3.5.9, respectively.

27

Figure 27-25—Data subcarrier constellation of HE-SIG-A symbols

(IEEE 802.11ax-2021, § 27.3.11.7.4)

$$\text{Length} = \left\lceil \frac{\text{TXTIME} - SignalExtension - 20}{4} \right\rceil \times 3 - 3 - m \quad (27\text{-}11)$$

where
TXTIME   is defined in 27.4.3 (in μs)
m is 1 for an HE MU PPDU and HE ER SU PPDU and 2 otherwise

(IEEE 802.11ax-2021, § 27.3.11.5)

82. In the Accused Products, the processor is configured to "determine the number of symbols of data of the non-legacy physical layer frame according to a following equation,

$$N_{\text{SYM}} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE\_PREAMBLE}} \right) / T_{\text{SYM}} \right\rfloor - b_{\text{PE\_Disambiguity}}$$ where $\lfloor x \rfloor$ denotes a largest integer less than or equal to x, L_LENGTH denotes the length information, m denotes a value obtained by subtracting the remaining value from the data size transmittable by a symbol of the legacy physical layer frame, $b_{\text{PE\_Disambiguity}}$ denotes a value of PE Disambiguity field, $T_{\text{HE\_PREAMBLE}}$ denotes a duration of non-legacy preamble of the non-legacy physical layer frame, T_{SYM} denotes a duration of a symbol of the data of the non-legacy physical layer frame":

27.3.13 Packet extension

. . .

The receiver computes N_{SYM}, T_{PE}, and N_{MA} using Equation (27-119), Equation (27-120), and Equation (27-122), respectively.

$$N_{SYM} = \left\lfloor \left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}} \right) / T_{SYM} \right\rfloor - b_{\text{PE-Disambiguity}} \quad (27\text{-}119)$$

$$T_{PE} = \left\lfloor \frac{\left(\frac{\text{L\_LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} \right) - N_{SYM}T_{SYM} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}}{4} \right\rfloor \times 4 \quad (27\text{-}120)$$

where

L_LENGTH is the value indicated by the LENGTH field of the L-SIG field

$T_{\text{HE-PREAMBLE}} = \quad (27\text{-}121)$

$$\begin{cases} T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-T}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE TB PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE SU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A}} + N_{\text{HE-SIG-B}}T_{\text{HE-SIG-B}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE MU PPDU} \\ T_{\text{RL-SIG}} + T_{\text{HE-SIG-A-R}} + T_{\text{HE-STF-NT}} + N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}, \text{ for an HE ER SU PPDU} \end{cases}$$

 where

  $T_{\text{RL-SIG}}$, $T_{\text{HE-STF-T}}$, $T_{\text{HE-STF-NT}}$, $T_{\text{HE-LTF-SYM}}$, $T_{\text{HE-SIG-A}}$, $T_{\text{HE-SIG-A-R}}$, and $T_{\text{HE-SIG-B}}$ are defined in Table 27-12

  $N_{\text{HE-SIG-B}}$ and $N_{\text{HE-LTF}}$ are defined in Table 27-15

$b_{\text{PE-Disambiguity}}$ is the value indicated by the PE Disambiguity subfield of the HE-SIG-A field for an HE SU, HE ER SU, or HE MU PPDU or the value indicated by the PE Disambiguity subfield in the Common Info field in the Trigger frame (see Table 9-29g) for an HE TB PPDU

. . .

$$N_{MA} = \begin{cases} 0, \text{ if Doppler} = 0 \\ max\left(0, \left\lfloor \frac{\text{L\_LENGTH} + 3 + m}{3} \times 4 - T_{\text{HE-PREAMBLE}} - (b_{\text{PE-Diambiguity}} + 2) \cdot T_{SYM} \right) / T_{MA} \right\rfloor \right), \text{ if Doppler} = 1 \end{cases} \quad (27\text{-}122)$$

(IEEE 802.11ax-2021)

83. In the Accused Products, "the PE Disambiguity field is set based on the duration of a symbol of the data of the non-legacy physical layer frame and an increment of duration to set a value of the length information based on a duration of a symbol of the legacy physical layer frame."

If transmitting an HE TB PPDU for which the TXVECTOR parameter TRIGGER_METHOD is TRIGGER_FRAME, each transmitter of an HE TB PPDU shall append a PE field with a duration T_{PE} calculated using Equation (27-114), except for an HE TB feedback NDP (see 27.3.4), which has $T_{PE} = 0$.

$$T_{PE} = \left\lfloor \frac{\left(\dfrac{\text{LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}}\right) - N_{SYM}T_{SYM} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}}{4} \right\rfloor \times 4 \quad (27\text{-}114)$$

where

$m = 2$ for an HE TB PPDU

LENGTH   is the value indicated by the UL Length subfield in the Common Info field in the Trigger frame

$T_{\text{HE-PREAMBLE}}$ is the value for an HE TB PPDU in Equation (27-121)

$T_{\text{HE-STF-T}}, T_{\text{HE-LTF-SYM}}, T_{\text{RL-SIG}},$ and $T_{\text{HE-SIG-A}}$ are defined in Table 27-12

N_{MA} is the number of midamble periods in the current PPDU

$$N_{SYM} = \left\lfloor \left(\frac{\text{LENGTH} + m + 3}{3} \times 4 - T_{\text{HE-PREAMBLE}} - N_{MA}N_{\text{HE-LTF}}T_{\text{HE-LTF-SYM}}\right) / T_{SYM} \right\rfloor - b_{\text{PE-Disambiguity}} \quad (27\text{-}115)$$

$b_{\text{PE-Disambiguity}}$ is the value of the TXVECTOR parameter HE_TB_PE_DISAMBIGUITY

The PE Disambiguity field of the HE-SIG-A field for an HE SU, HE ER SU (see Table 27-18), or HE MU PPDU (see Table 27-20) shall be set to 1 if the condition in Equation (27-118) is met; otherwise, it shall be set to 0.

(IEEE 802.11ax-2021, § 27.3.13)

84. Defendants have also knowingly and intentionally induced and contributed to infringement of the '421 patent in violation of 35 U.S.C. §§ 271(b) and 271(c). For example, Defendants have had knowledge or were willfully blind of the '421 patent and the infringing nature of the Accused Products at least because ACC had received the January 18, 2003, letter from Sisvel identifying the '421 patent as "essential to the 802.11ax standard" and because Askey was aware that it sold products that implement essential features of the standard.

85. Despite this knowledge of the '421 patent, Defendants have continued to actively encourage and instruct its customers to use and integrate the Accused Products in ways that directly infringe the '421 patent. Defendants have done so knowing and intending that their customers would commit these infringing acts. Defendants have also continued to make, use, offer for sale, sell, and/or import the Accused Products, despite their knowledge of the '421 patent, thereby

specifically intending for and inducing their customers to infringe the '421 patent through the customers' normal and customary use of the Accused Products.

86. On information and belief, the Accused Products contain components that constitute a material part of the '421 patent invention and that are not a staple article or commodity suitable for substantial noninfringing use. On information and belief, Defendants have sold, offered for sale, and imported into the United States such components knowing they are especially made or especially adapted for use in infringement of the '421 patent.

87. On information and belief, Defendants' infringement has and continues to be willful. Defendants, without a good faith belief of invalidity or non-infringement, have known or have been willfully blind to the fact that making, using, offering to sell, or selling the Accused Products to their customers, infringes the '421 patent.

88. Defendants have induced, and continue to induce, infringement of the '421 patent by actively encouraging others (including its customers) to use, offer to sell, sell, and import the Accused Products. On information and belief, these acts include providing information and instructions on the use of the Accused Products; providing information, education, and instructions to its customers; providing the Accused Products to customers; and indemnifying patent infringement within the United States.

89. Askey and its customers benefit from the use of the inventions claimed in the '421 patent. On information and belief, these benefits include faster throughput, higher capacity, broader coverage, and improved coexistence when using Wi-Fi 6 communications.

90. Wilus has been damaged by Defendants' willful infringement of the '421 patent and is entitled to damages as provided for in 35 U.S.C. § 284, including reasonable royalty damages.

31

JURY DEMAND

91.   Wilus demands a jury trial pursuant to Federal Rule of Civil Procedure 38.

RELIEF REQUESTED

Wilus prays for the following relief:

A.   A judgment in favor of Wilus that Defendants have infringed the Asserted Patents, and that the Asserted Patents are valid and enforceable;

B.   A judgment and order requiring Defendants to pay Wilus past and future damages arising out of Defendants' infringement of the Asserted Patents in an amount no less than a reasonable royalty, costs, expenses, and pre- and post-judgment interest for its infringement of the Asserted Patents, as provided under 35 U.S.C. § 284;

C.   A permanent injunction prohibiting Defendants from further acts of infringement of the Asserted Patents;

D.   A judgment and order requiring Defendants to provide an accounting and to pay supplemental damages to Wilus, including, without limitation, pre-judgment and post-judgment interest;

E.   A judgement that Defendants' infringement is willful and enhanced damages and fees as a result of that willfulness under 35 U.S.C. § 284;

F.   A finding that this case is exceptional under 35 U.S.C. § 285, and an award of Wilus' reasonable attorney's fees and costs; and

G.   Any and all other relief to which Wilus may be entitled.

Dated: September 13, 2024

Respectfully submitted,

/s/ Marc Fenster
Marc Fenster
CA State Bar No. 181067
Email: mfenster@raklaw.com
Reza Mirzaie
CA State Bar No. 246953
Email: rmirzaie@raklaw.com
Dale Chang
CA State Bar No. 248657
Email: dchang@raklaw.com
Neil A. Rubin
CA State Bar No. 250761
Email: nrubin@raklaw.com
Jacob Buczko
CA State Bar No. 269408
Email: jbuczko@raklaw.com
Jonathan Ma
CA State Bar No. 312773
Email: jma@raklaw.com
RUSS AUGUST & KABAT
12424 Wilshire Blvd. 12th Floor
Los Angeles, CA 90025
Telephone: 310-826-7474

**ATTORNEYS FOR PLAINTIFF,
Wilus Institute of Standards and
Technology Inc.**